

### **Amendments to the claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application.

### **Listing of Claims**

1. (Currently Amended) A method for fragmenting an incoming packet for transmission as a first outgoing packet and a second outgoing packet, the method comprising:

storing within computer memory of a gateway device a payload of the incoming packet in a plurality of storage units beginning in a first storage unit, wherein a size of the incoming packet exceeds a maximum packet size for a network connection;

the gateway device transmitting on the network connection the first outgoing packet being formed according to a predetermined portion of the payload stored in the first storage unit; and

after transmitting the first outgoing packet, the gateway device transmitting on the network connection the second outgoing packet being formed according to a remaining portion of the payload stored in the storage units;

wherein the remaining portion corresponds to a majority of the payload of the incoming packet.

2. (Original) The method of claim 1, wherein the first and second outgoing packets are Point-to-Point Protocol over Ethernet (PPPoE) frames.

3. (Original) The method of claim 1, further comprising:

generating a first outgoing sub-header according to a header of the incoming packet and the predetermined portion of the payload stored in the first storage unit;

generating a second outgoing sub-header according to the header of the incoming packet or the first outgoing sub-header, and the remaining portion of the payload;

including the first outgoing sub-header and the predetermined portion of the payload stored in the first storage unit in the first outgoing packet; and

including the second outgoing sub-header and the remaining portion of the payload stored in the storage units in the second outgoing packet.

4. (Original) The method of claim 3, wherein the incoming packet is an Internet Protocol (IP) packet and the header of the incoming packet is the IP header of the incoming IP packet.

5. (Original) The method of claim 4, wherein the first outgoing sub-header is a first IP header corresponding to the predetermined portion of the payload stored in the first storage unit and the incoming IP header, and the second outgoing sub-header is a second IP header corresponding to the remaining portion of the payload, and the incoming IP header or the first outgoing sub-header.

6. (Original) The method of claim 4, wherein generating the first outgoing sub-header comprises modifying the MF, Offset, Length, and Checksum fields of the incoming IP header according to the predetermined portion of the payload stored in the first storage unit.

7. (Original) The method of claim 4, wherein generating the second outgoing sub-header comprises modifying the MF, Offset, Length, and Checksum fields of the incoming packet IP header or the first outgoing sub-header according to the remaining portion of the payload stored in the storage units.

8. (Original) The method of claim 3, wherein the first outgoing sub-header and the first fragment are included as a first outgoing payload of the first outgoing packet, and wherein the second outgoing sub-header and the second fragment are included as a second outgoing payload of the second outgoing packet.

9. (Currently Amended) A method for fragmenting an incoming packet for inclusion in a first outgoing packet and a second outgoing packet, the method comprising:

storing a payload of the incoming packet as a first fragment and a second fragment in a plurality of storage units within computer memory of a gateway device, wherein a size of the incoming packet exceeds a maximum packet size for a network connection;

the gateway device including the first fragment in the first outgoing packet; and

after including the first fragment in the first outgoing packet, the gateway device including the second fragment in the second outgoing packet;

wherein the second fragment corresponds to a majority of the payload of the incoming packet.

10. (Original) The method of claim 9, wherein the incoming packet is an Internet Protocol (IP) packet received in an Ethernet frame and the first and second outgoing packets are Point-to-Point Protocol over Ethernet (PPPoE) frames.

11. (Original) The method of claim 9 further comprising:  
generating a first outgoing sub-header and a second outgoing sub-header according to the first fragment, the second fragment, and a header of the incoming packet;  
including the first outgoing sub-header in the first outgoing packet; and including the second outgoing sub-header in the second outgoing packet.

12. (Original) The method of claim 11, wherein the incoming packet is an incoming Internet Protocol (IP) packet and the header of the incoming packet is the IP header of the incoming IP packet.

13. (Original) The method of claim 12, wherein the first outgoing sub-header is a first outgoing IP header generated corresponding to the first fragment and the IP header of the incoming IP packet, and the second outgoing sub-header is a second outgoing IP header generated corresponding to the second fragment, and the IP header of the incoming IP packet or the first outgoing sub-header.

14. (Original) The method of claim 12, wherein generating the first outgoing sub-header comprises modifying the MF, Offset, Length, and Checksum fields of the incoming packet IP header according to the first fragment.

15. (Original) The method of claim 12, wherein generating the second outgoing sub-header comprises modifying the MF, Offset, Length, and Checksum fields of the incoming packet IP header or the first outgoing sub-header according to the second fragment.

16. (Original) The method of claim 11, wherein the first outgoing sub-header and the first fragment are included in a payload of the first outgoing packet, and wherein the second outgoing sub-header and the second fragment are included in a payload of the second outgoing packet.

17-19. (Cancelled)

20. (Currently Amended) A method for fragmenting an incoming packet for transmission as first and second outgoing packets, the method comprising:

storing payload of the incoming packet in a storage unit within computer memory of a gateway device, wherein a size of the incoming packet exceeds a maximum packet size for a network connection;

the gateway device transmitting the first outgoing packet being formed according to a predetermined portion of the payload stored in the storage unit; and

after transmitting the first outgoing packet, the gateway device transmitting the second outgoing packet being formed according to a remaining portion of the payload stored in the storage unit;

wherein the size of the second outgoing packet is larger than that of the first outgoing packet.

21. (Previously presented) The method of claim 20, wherein the first and second outgoing packets are Point-to-Point Protocol over Ethernet (PPPoE) frames.

22. (Previously presented) The method of claim 21, wherein the incoming packet is an Internet Protocol (IP) packet and the header of the incoming packet is the IP header of the incoming IP packet.

23. (Previously presented) The method of claim 20, further comprising:  
generating a first outgoing sub-header according to a header of the incoming packet and the predetermined portion of the payload stored in the storage unit;  
generating a second outgoing sub-header according to the header of the incoming packet or the first outgoing sub-header, and the remaining portion of the payload;  
including the first outgoing sub-header and the predetermined portion of the payload stored in the storage unit in the first outgoing packet; and  
including the second outgoing sub-header and the remaining portion of the payload stored in the storage unit in the second outgoing packet.

24. (New) The method of claim 1, wherein the first outgoing packet is stored in a single storage unit of the computer memory of the gateway device and the second outgoing packet is stored in a plurality of storage units of the computer memory of the gateway device, wherein as soon as all data stored in a respective storage unit is transmitted, the respective storage unit is freed for other uses by the gateway device.

25. (New) The method of claim 9, wherein the first outgoing packet is stored in a single storage unit of the computer memory of the gateway device and the second outgoing packet is stored in a plurality of storage units of the computer memory of the gateway device, wherein as soon as all data stored in a respective storage unit is transmitted, the respective storage unit is freed for other uses by the gateway device.

26. (New) The method of claim 20, wherein the first outgoing packet is stored in a single storage unit of the computer memory of the gateway device and the second outgoing packet is stored in a plurality of storage units of the computer memory of the gateway device, wherein as soon as all data stored in a respective storage unit is transmitted, the respective storage unit is freed for other uses by the gateway device.